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## THE PURIFICATION OF WATER SUPPLIES BY THE USE OF HYPOCHLORITES.

By WILLIAM PITTS MASON, M.D.

*(Read April 23, 1909.)*

There is no question but those of us who have taken ground as opposed to the "disinfection" of water by "bleach," hypochlorite of sodium, or other similar substances, must change our position. The experimental work in France and England; the improvement of the water of Bubbly-Brook at the Chicago Stock Yards, and, above all, the remarkable results secured by the Jersey City Water Supply Co., when operating upon the entire municipal supply of Jersey City, suffice to silence opposition to what may be termed the most recent purification method of to-day.

It is true that some years ago the "Woolf" process was proposed, whereby an electrolyzed salt solution was employed for addition to either sewage or water; and still further back the "Webster" plan was advocated; but none of the hypochlorites was exploited in the systematic and exhaustive manner that has been recently accomplished, nor has the smallness of the "dose" that will accomplish efficient treatment ever been suspected. Let the following facts speak for themselves:

Lake water was treated with increasing "doses" of "bleaching-powder" equivalent to the amount of available chlorine indicated. It was then allowed to stand three hours in the dark, shaken and sowed for "total count" of bacteria.

Dose of Bleach.		
Grains per Gallon.	Parts per Million.	Bacteria per c.c.
0	0	102,900
3/100	.51	410
1/20	.85	320
1/10	1.70	175
1/8	2.12	100
1/4	4.25	95
1/2	8.50	45

Numerous similar sowings were made and even lower counts of residual germs were found.

Upon examining waters charged with pure cultures of *Bacillus coli communis*, and others contaminated with fresh fecal material of human origin, no gas-forming bacteria of any kind were found alive in any instance after the use of even the smallest dose of "bleach" shown above.

Other experimenters have reached similar conclusions with still smaller doses of "available chlorine." The most satisfactory test of the process, however, is the practical one of treating the entire municipal supply daily furnished to Jersey City. The dose there used during the month of December, 1908, averaged approximately .03 grain available chlorine per gallon and has since been materially reduced. While using the above amount the daily counts of bacteria for the month were:

RAW WATER.

Maximum .....	1,600
Minimum .....	240
Average .....	559

TREATED WATER.

Maximum .....	30
Minimum .....	0
Average .....	2.7

No part of this minute dose of hypochlorite reaches the consumer and protection against pathogenic organisms appears to be assured.

It is not expected that the process will take the place of filtration because it does not aid in improving the physical appearance of a water, but as an adjunct to a filter plant there can be no question of its usefulness in times of emergency, and it can surely be depended upon to render a reasonably polluted water safe for domestic purposes, and do it at a moderate price.

It goes without saying that the hypochlorite of sodium, obtained by electrolyzing a solution of common salt, can be substituted for the bleaching powder whenever local conditions allow of its cheap manufacture. The effect upon bacterial life is the same.

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